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PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY.

VOL. II. MAY & JUNE, 1841. No. 18.

Stated Meeting, May 7.

Present, twenty-seven members.

Mr. DU PONCEAU, President, in the Chair.

Mr. Isaac R. Jackson, and Professor Roswell Park, members elect, were introduced, and signed the Laws.

Letters were received, and read :—

From the Perpetual Secretary of the Royal Academy of Inscriptions, &c., Institute of France, dated 16th Nov. 1840, and 15th Feb. 1841, acknowledging the receipt of Vol. VII. Part 1, of the Transactions, and of No. 13, of the Proceedings of the Society.

From M. Felix Lajard, Provisional Secretary of the Royal Academy of Sciences, Institute of France, dated 8th Dec. 1840, accompanying Vol. XIV. Part 2, of its Memoirs, and communicating information relative to the course of the Academy's publications, its public sittings, the prizes it distributes, &c. The Provisional Secretary announces the purpose of the Academy to transmit its weekly reports, *procés verbaux*, &c., with renewed regularity to the Society, and invites a closer correspondence, and more frequent interchanges between the two Institutions.*

From Count J. Gräberg de Hemsö, to the Librarian, dated Florence, 26th Nov. 1840, and 4th Jan. 1841, and to one of the

* The programme of prizes, &c., referred to in M. Lajard's letter as accompanying it, and to which the Society was requested to give publicity, did not arrive.

Secretaries, dated 16th Jan. 1841, relating to numerous donations heretofore transmitted by him to the Library.

The following donations were announced :—

TO THE LIBRARY.

Des Moyens de soustraire l'Exploitation des Mines de Houille aux chances d'Explosion, &c. &c. Brussels, 1840. 8vo.—*From the Royal Academy of Brussels.*

Transactions of the Royal Irish Academy. Vol. XIX. Part I. Dublin, 1841. 4to.—*From the Academy.*

Transactions of the Royal Society of Edinburgh. Vol. XIV. Part I. Edinburgh 1839. 4to.—*From the Society.*

Proceedings of the Royal Society of Edinburgh. Nos. 13, 14, 15, 1838, 1839. 8vo.—*From the same.*

Astronomical, and Magnetical, and Meteorological Observations, made at the Royal Observatory, Greenwich, in the year 1839, &c. &c. London, 1840. 4to.—*From the Royal Society.*

List of the Council, Scientific Committees, and Fellows of the Royal Society, Nov. 30, 1840. 4to.—*From the same.*

Proceedings of the Royal Society. No. 45. Nov. 1840. 8vo.—*From the same.*

The Laws of the Historical Society of Science, and List of its Officers and Members. London, 1840. 8vo.—*From the same.*

Institut Royal de France: Séance Publique Annuelle de l'Académie des Inscriptions et Belles Lettres, du Sept. 25, 1840. Paris, 1840. 4to.—*From the Institute.*

Mémoires de l'Institut Royal de France, Académie des Inscriptions et Belles Lettres. Tome XIV. Paris, 1840. 4to.—*From the same.*

Société d'Encouragement pour l'Industrie Nationale, Calendrier pour 1841, Liste des Membres, &c. Paris.—*From the Society.*

Recueil des Actes de la Séance Publique de l'Académie Impériale des Sciences de St. Pétersbourg, tenue le 29 Déc. 1838. St. Petersburg, 1839. 4to.—*From the Academy.*

Recueil des Actes de la Séance Publique de l'Académie Impériale, &c. &c., du 29 Déc. 1839. St. Petersburg, 1840. 4to.—*From the same.*

Mémoires de l'Académie Imperiale, &c. &c. VIme. Sér.—Sciences Politiq. Hist. Philolog. Tom. IVme, 4me et 5me Livrns.—Sciences Mathém. Phys. et Natur. Tome IVme, prém. Partie.

Mathém. et Phys. Tom. IId, 3me et 4me Livrns.—Sciences Mathém. Phys. et Natur. Tom. Vme. 2d Partie. Natur. Tom. IIIme, 1re, 2de, 3me et 4me Livrns. St. Petersburg, 1839, 1840. 8 Livrns. 4to.—*From the same.*

Vocabulario Universale della Lingua Italiana. Vol. VI. Fasc. XXXVII. Vol. VII. Fasc. XL. XLI. Naples, 1839, 1840. Fol. *From the Chev. Morelli.*

De la Vérité; ou Méditations sur les moyens de parvenir á la Vérité, &c. &c., par J. P. Brissot de Warville, (with MS. Notes by the Author.) Neufchatel, 1782. 8vo.—*From Mr. John Penington.*

Nouveaux Documens relatifs á l'emploi alimentaire de la Gelatine en 1840, par M. d'Arcet, &c. &c. Paris, 1840. 8vo.—*From Mr. D. B. Warden.*

Specchio Geografico, e Statistico, del l'Impero di Marocco, del Cavaliere Conte Jacopo Grâberg di Hemsö, &c. &c. Genoa, 1834. 8vo.—*From the Author.*

Nouvelles Recherches sur l'Inscription en lettres sacrées du Monument de Rosette. Florence, 1830. 8vo.—*From the same.*

Cenni Geografici e Statistici su l'Asia Centrale, e principalmente sul paese dei Kirghizi e sul Khanato di Khiva, per Jacobo Grâberg da Hemsö, &c. &c. Milan, 1840. 8vo.—*From the same.*

Descrizione delle orde e delle steppe dei Kirghizi-Kazaki, opera dal Signor Alessio de Leuchine, oro notomizzata per Jacopo Grâberg da Hemsö. Milan, 1840. 8vo.—*From the same.*

Dalla Necessita d'un Istituto Agrario che stabilmente provveda all'incremento dell'Agricoltura Toscana, &c. &c. Memoria dal Marchese Francesco Maria Riccardo del Vernaccia, &c. &c. Florence, 1839. 8vo.—*From the same.*

The same Memoir, translated into French, by Count J. Grâberg da Hemsö. Paris, 1840. 8vo.—*From the same.*

Sul Sistema di Rotazione in Coltura, &. &c. Memoria dal Conte Jacopo Grâberg da Hemsö. Florence, 1840. 8vo.—*From the same.*

Thirteen Reviews, &c. for different periodical publications, by Count J. Grâberg da Hemsö. 1829—1839.—*From the same.*

Phrenology; a Lecture delivered before the Woodville Lyceum Association, by Mariano Cubi i Soler, Professor of Modern Languages, &c. &c. Boston, 1840. 8vo.—*From the Author.*

Report of a Survey and Exploration of the Coal and Ore Lands belonging to the Alleghany Coal Co. &c. &c. By Walter R. John-

son, A.M. &c. &c. Philadelphia, 1841. 8vo.—*From the Author.*

Review of the Dictionarium Anamitico-Latinum, &c. By John Pickering, Esq. &c. &c. Boston, 1841. 8vo.—*From the Author.*

Eighth Annual Report of the Managers of the Pennsylvania Institution for the Instruction of the Blind. Philadelphia, 1841. 8vo.—*From the Managers.*

A Memoir, &c. of the late Joseph Parrish, M.D. &c. &c. By George B. Wood, M.D. Philadelphia, 1840. 8vo.—*From the Author.*

A Discourse on the Death of William Henry Harrison, &c. &c. By George W. Bethune, Minister of the Reformed Dutch Church, Philadelphia, 1841. 8vo.—*From the Author.*

Biographical Notice of Benjamin Silliman, M.D. LL.D. &c. &c. By Professor Kingsley.—*From Mr. Vaughan.*

Statistics of the Class of 1837, Yale College. 1840. 8vo.—*From Mr. B. Silliman, Jr.*

Contributions towards a History of the Star-Showers of former Times. By Edward C. Herrick, &c. &c. 1841. 8vo.—*From the same.*

Catalogue of Books, &c. added to the Library of the N. Y. Historical Society since Jan. 1839. New York, 1840. 8vo.—*From the Society.*

Twenty-fourth Report to the London Provident Institution, or Bank for Savings. 20th Nov. 1840.—*From William Vaughan, Esq.*

A Plan, showing the Progress of the Thames Tunnel.—*From Petty Vaughan, Esq.*

Abstract of a Meteorological Journal for the year ending 30th Nov. 1840, kept by N. W. Hatch, in the city of Vicksburg, Lat. 32½°. *From the Author.*

Register of Debates in Congress, by Gales & Seaton. Vols. I. II. 1824, 1825, 1826. 8vo.—*From Mr. John Vaughan.*

Lieut. John A. Dahlgren, U. S. N. deposited in the Library of the Society—

The Statistical Reports on the Health of the British Navy, for the Years 1830 to 1836, inclusive; and The British Navy Estimates for the Year 1840–41.

The Committee, consisting of Mr. Walker, Dr. Patterson, and Mr. Justice, to whom was referred a paper, read on the 2d and 16th of April last, entitled "Astronomical Observations at

Hudson Observatory, by Elias Loomis, Professor of Mathematics and Natural Philosophy in Western Reserve College," reported in favour of its publication in the Transactions; which was ordered accordingly.

The paper of Professor Loomis contains the Astronomical Observations made at the Hudson Observatory in 1840, and part of 1839, being a sequel to those published in Vol. VII. Part I. Art. IV. of the Transactions.

1st. The latitude of the observatory is determined to be 41° 14′ 40″,—being the mean from 9 lower culminations of Polaris, in 1840, giving 41° 14′ 42″.3, and 6 upper culminations in 1839, giving 41° 14′ 38″.1. Its longitude is stated to be 5h 25m 45s West.

2d. The series of moon culminations, ending last year with No. 50, is now extended to No. 125; and the method is pointed out, by which observations of the moon's limb, which have been made on a side wire, are reduced to the middle wire of the instrument.

3d. Seven occultations of fixed stars by the moon, are given.

4th. Observations are presented of the 2d Comet of 1840, discovered by Galle, January 25, at Berlin. The proximate elements of this Comet by Encke, were received by Professor Loomis, from Mr. S. C. Walker, on the 14th of March; and the Professor having prepared an ephemeris, found the Comet on the next clear evening, the 18th, and made satisfactory observations of its place in the heavens.

These observations, corrected for parallax and refraction, are stated as follows:

1840.	Berlin Mean Time.			Comet's A. R.			Comet's Dec.		
	h	*m*	*s*	*h*	*m*	*s*			
March 18	14	18	12.34	29	40	43.8			
	14	28	54 89				+ 22°	49′	51.8″
19	14	8	4.04	30	7	45.1			
	14	9	27.52				+ 22	17	5.9
21	14	32	5.63	31	1	2.5			
	14	0	23 72				+ 21	14	49.0
25	14	12	52.44	32	40	7.8			
	14	34	24.72				+ 19	15	35.1
April 1	14	22	41.82				+ 16	7	29.7
2	14	23	15.53	35	39	25.0			
	13	57	59.69				+ 15	42	2.0

These, with 34 observations by Rümker, at Hamburg, 26 by Argelander, at Bonn, and 12 by Encke, at Berlin, received through

Mr. Walker, Mr. Loomis compares with the ephemeris of Mr. R. Kysæus, and thence deduces, for six intermediate dates, the normal places of the Comet, for 8 o'clock P. M., mean time Berlin.

Date 1840.	Comet's places freed from aberration.						Corrections of Ephemeris.		Probable error of normal places.
	A. R.			Dec.			A. R.	Dec.	
	d h	°	′	″	°	′	″	″	″	″
Jan.	31 8	326	25	5.3	+ 61	25	15.4	+ 14.7	— 8.1	+ 2.7
Feb.	12 8	358	8	24.9	51	2	50.7	— 12.7	— 1.1	2.5
	23 8	13	19	36.0	40	11	32.5	— 17.3	+ 7.8	1.7
March	3 8	21	1	17.4	32	39	19.0	— 28.0	+ 17.6	1.2
	12 8	26	34	40.9	26	28	14.8	— 32.6	+ 22.4	1.5
	24 8	32	9	57.6	19	52	15.7	— 40.2	+ 25.0	1.9

Prof. Loomis then gives the perturbations of the Comet, computed after the method of Bessel for the Comet of 1807, for 3 intervals of 18 days each, from which their values are interpolated for the 6 dates, and subtracted from the Comet's normal places, previously referred to the ecliptic, and the mean equinox, Jan. 1st, 1840: thus

Date.	Perturbations.		Comet's Longitude less Perturbations.			Comet's Latitude less Perturbations.		
	Long.	Lat.						
	″	″	°	′	″	°	′	″
Jan. 31	0.0	0.0	15	0	50.0	+ 65	37	49.6
Feb. 12	0.0	— 1.1	24	50	22.3	46	10	41.5
23	— 0.2	— 1.9	29	22	27.8	31	27	35.5
March 3	— 0.4	— 2.3	32	2	14.6	22	0	28.2
12	— 0.7	— 2.5	34	14	5.2	14	26	39.0
24	— 1.1	— 2.7	36	45	4.7	6	27	27.7

From these, by means of 12 equations of condition resolved by the method of least squares, Prof. Loomis derives the parabolic elements of the Comet, and then by varying the sixth element, (the eccentricity,) after Bessel's example, obtains the elliptic elements, both as follows, the motion being retrograde.

	Parabolic Elements.			Elliptic Elements.		
Perihel. passage, m. t. Berlin,	March 12*d*. 981921			March 13*d*. 153768		
	°	′	″	°	′	″
Longitude of Perihel.	80	20	24.4	80	12	3.52
„ ascending node,	236	48	39.3	236	50	34 67
Inclination of orbit,	59	14	2.4	59	12	36.14
Logarithm. of Perihel. dis.		0.0870185			0.0865202	
Eccentricity,					0.99323412	
Semi-axis major,					180.383	
Periodic time,					2422.6 yrs.	

The errors of the respective orbits, are as follows: those in longitude being multiplied by the cosine of declinations.

Date.	Errors of Parabolic Elements.		Errors of Elliptic Elements.	
	Longitude.	Latitude.	Longitude.	Latitude.
Jan. 31	+ 4".4	+ 2".6	+ 0".6	+ 1".8
Feb. 12	− 1.4	− 1.9	+ 0.4	− 3.9
23	− 6.1	+ 1.5	− 2.6	+ 2.0
March 3	− 2.7	− 1.7	+ 0.1	+ 0.6
12	+ 0.1	− 0.7	+ 0.5	+ 1.1
24	+ 5.9	+ 1.1	+ 0.9	− 1.5
	Sum of Squares of Errors,		Sum of Squares of Errors,	
	117".85		34".62	

Mr. Loomis remarks, in conclusion, that there is no room for hesitation in the choice between the two orbits, though the last element is liable to considerable uncertainty.

Mr. Boyé communicated to the Society the results of the analysis of three different varieties of felspar from the primary rocks of the State of Delaware, as performed by Professor Booth and himself.

In the granitic veins that traverse the Serpentine, at Tucker's quarry, six miles N. W. of Wilmington, the felspar occurs in large masses, of which two different varieties may be distinguished; one having most of the characters of common potassa, felspar, or orthoclas, which is used for several technical purposes; the other resembling albite or soda-felspar, and exhibiting a peculiar tendency to undergo decomposition. As these two varieties of felspar may be supposed to enter generally into the composition of the gneiss and other primary rocks of this region, and thereby affect, not merely their mineralogical character, but also their stability when employed in construction, or for other purposes, it was considered a matter of interest to know their exact composition. They were, therefore, subjected by Prof. Booth and Mr. Boyé, to a thorough analysis by fusion with three times their weight of carbonate of soda, &c. &c. To determine their alkalies, they were decomposed by exposure on a shallow platinum capsule, to the vapours of fluohydric acid, in a close leaden vessel as described by Brunner. The fluosilicates were then decomposed by concentrated sulphuric acid, and the alumina precipi-

tated by ammonia; and after the remaining sulphates had been converted into carbonates by acetate of lead, and the carbonates of soda and potassa into chlorides, the joint weight of these two chlorides was ascertained, and the chloride of potassium afterwards separated by chloroplatinate of sodium and alcohol. The results thus obtained were as follows:

Felspar, from the granitic vein at Tucker's quarry, six miles N. W. of Wilmington.

1st variety. (Orthoclas.)

Colour white; lustre vitreous, inclining to pearly; translucent. Fracture distinctly rhomboidal, traversed by innumerous parallel cracks or fissures, which impart to it a milky or opaque appearance. Specific gravity in piece, 2.562, in powder, 2.585, at temperature 69° F.

Composition in 100 parts.

		Oxygen.		
Silica	65.24	33.89		
Alumina	19.02	8.88		11.83
Peroxide of Iron	a trace			
Magnesia	0.13	0.050	2.948	
Lime	0.33	0.092		
Soda	3.06	0.782		
Potassa	11.94	2.024		
	99.72			

2d variety. (Albite.)

Colour white, transparent; lustre pearly, inclined to vitreous. Fracture more irregular; the surface of the fracture striated, curved, or exhibiting obtuse angles. Hardness slightly inferior to the former. It fuses with great difficulty before the blow-pipe, but is slightly more fusible than the preceding. Specific gravity in piece 2.612, at 71° F.

Composition in 100 parts.

		Oxygen.		
Silica	65.46	34.01		
Alumina	20.74	9.685	9.85	13.22
Peroxide of Iron	0.54	0.165		
Magnesia	0.74	0.286	3.37	
Lime	0.71	0.227		
Soda	8.98	2.552		
Potassa	1.80	0.305		
	99.97			

Mr. Boyé remarked, that felspar being a double oxysalt of two

neutral silicates, one of a base containing 2 atoms of metallic radical with three atoms of oxygen (alumina and peroxide of iron), the other a silicate of such alkaline or earthy bases, as contain one atom of radical combined with one atom of oxygen (potassa, soda, lime, magnesia (?)), the oxygen contained in the silica ought always to be three times that contained in all the bases; while again the oxygen in the alumina and peroxide of iron ought to be equal to three times that contained in the other bases. He called attention to the fact, that this latter is exactly the case in both of the above varieties, but that if the oxygen contained in all the bases be multiplied by three, a small deficiency of oxygen is made apparent in the silica of the first variety, amounting to 1.6; ($3\times11.83=35.49$;) but, that the deficiency of oxygen in the second variety is so great, amounting to 5.6, ($3\times13.22=39.66$), that it cannot be accidental. Indeed, the proportion of oxygen in the silica to that in the bases of this variety, may be nearly indicated as $2\frac{1}{2}$ to 1, ($2\frac{1}{2}\times13.22=33.05$); thus leaving it uncertain, in Mr. Boyé's opinion, whether it be a different variety, or a mixture of a felspar with an analogous subsilicate. The specimen employed for analysis showed no signs of commencing decomposition, though it would seem natural to connect the deficiency of silica which it exhibited with liability to such a change. The analyses also exhibit the fact, that the principal alkali in the first variety is potassa, with a comparatively small proportion of soda, while the alkali in the latter is principally soda, with a small amount of potassa.

Mr. Boyé proceeded to remark, that the rock which constitutes the south-eastern portion of the primary formation of the state, differs in many respects from the others, and has received the appellation of *the blue rock* from its peculiar colour. The principal constituent of this rock is a translucent felspar, of a bluish or smoky colour, which sometimes in an irregular congregation constitutes the whole mass. The rock affords, in many places, a very superior material for architectural purposes, and its principal constituent, the felspar, was therefore likewise subjected to analysis, with a view to compare it with the two preceding. The result of this analysis was as follows:

Felspar of the blue rock, from Quarryville, 3 miles N. E. of Wilmington.

Colour smoky gray, translucent; powder nearly white. Fracture in mass irregular, coarse-grained; that of distinct portions rhomboidal. This variety of felspar exhibits, sometimes, a slight but indistinct play of colours. Specific gravity in piece, 2.603, temp. 70° F.

Composition in 100 parts.

		Oxygen.		
Silica	66.51	34.55		
Alumina	17.67	8.25	8.66	11.56
Peroxide of Iron	1.33	0.41		
Magnesia	0.30	0.116	2.897	
Lime	1.24	0.347		
Soda	3.03	0.774		
Potassa	9.81	1.660		
	99.89			

In comparing this result with the two former, Mr. Boyé observed, that this felspar approaches, in composition, more nearly to the first of the others; but, that a small portion of the potassa is replaced by lime, to which latter, and the oxide of iron, it probably owes its higher specific gravity. To these two ingredients, as well as to the full proportion of silica which it exhibits, ($3\times11.56=34.68$,) may be referred the indestructibility and other superior qualities which are ascribed to this variety.

Mr. B. closed his remarks by mentioning the recently published report of Professor Booth, on the geology of Delaware, as presenting a detailed and interesting notice of these several rocks.

Mr. Lea submitted to the examination of the members, a volume containing two hundred specimens of photogenic drawings of the plants in the vicinity of Philadelphia, by his son, Mr. Carey Lea.

Prof. A. D. Bache laid before the Society a diagram representing the direction and force of the wind, and the amount and rate of fall of the rain, during the severe gust of April 2d.

The diagrams were copies of the register kept at the Philadelphia Magnetic Observatory, at the Girard College, traced by the self-registering anemometer. The bi-hourly register of the barometer showed, that the pressure diminished from early in the morning to the time of the observation next preceding the gust, at the rate of about .09 of an inch every two hours. The wind during the day was generally from the S., and light, veering in the afternoon, occasionally nearly to S. by W. Between $6h\ 7m$, P. M. and $6h\ 20m$, it had changed from S. to N. W. by W., and the pressure between $6h\ 14m$ and $6h\ 21m$ increased from 0 to 20 lbs. avoirdupois, upon the square foot. Rain began to fall about $6h\ 15m$, the wind having at that time reached the W. in direction, with a force of less than $\frac{1}{4}$ of

a lb. to the square foot. The fall of rain was not remarkable. The extreme force of the gust was at its beginning, the pressure declining in 15*m* from 20 to 15 lbs. and reaching $3\frac{1}{3}$ lbs. at 7*h* 10*m*, when it again increased. At the regular observation of the barometer, about twenty minutes past 6 o'clock, the wind having then the direction of N. W. by W. and a force of nearly 20lbs., the barometer stood at 29.548 inches, (corrected,) the temperature of the air being 50°, and the elastic force of vapour calculated from the evaporating point, and temperature being 0.357 inches. The rise of the barometer between the 4 and 6 o'clock observations, had been but .06 of an inch, and the pressure continued to increase during the night. The force of this storm is almost exactly that assigned in the table attached to the report of the Committee of Physics of the Royal Society of London, to a "great storm." It is to be regretted that an observation was not taken immediately preceding the storm, to know if there was a sudden fall of the barometer at that period.

Prof. Bache also described to the Society a modification of the part of Ostler's self-registering anemometer, which measures the force, made by Mr. S. W. Hall, first assistant at the Magnetic Observatory at the Girard College, and applied to the instrument there.

It consists in substituting slightly curved bars or nearly flat springs attached to the table or frame of the registering part of the instrument, for the spiral springs applied in the original instrument behind the plate which receives the impulse of the wind. One only of these springs acts in measuring the force of light breezes, and the second is brought into play in stronger winds. The sensibility of the instrument is much increased in winds below five pounds to the square inch, while the instrument retains the range of the original one. The friction of the apparatus necessary to guide the spring, and the exposure of the spring to the weather and to great fluctuations of temperature are avoided. The springs being in the recording room, their action may be observed at any time, and repairs or changes required may be readily made. The removal of a considerable weight from near the top of the vane and greater compactness are further advantages of this modification of the original plan. The springs actually used are of hammered brass.

Mr. Lea, on behalf of the Publication Committee, reported that all the papers which had been ordered to be published in the Transactions were in type.

Mr. Kane, Reporter, laid upon the table a copy of the Proceedings of the Society, No. 17, for March and April, 1841.

Stated Meeting, May 21.

Present, twenty-five members.

Mr. Du Ponceau, President, in the Chair.

Mr. Peter, a member elect, was introduced, and signed the Laws.

Letters were read—

From William Peter, Esq., dated 10th May, 1841, making acknowledgments for the honour of his election to membership:—

From Josiah Quincy, President of Harvard University, dated 6th May, 1841, acknowledging, on behalf of the corporation, the receipt of Vol. VII. Part 3, of the Transactions:—

From the Corresponding Secretary of the Georgia Historical Society, dated Savannah, 20th Jan. 1841, communicating the appointment of Dr. William B. Stevens as historian of the State of Georgia, and asking access for him to any historical documents in the library of the Society.

On motion of Mr. Kane, it was resolved, that Dr. William B. Stevens, of the Georgia Historical Society, be allowed the unrestricted use of the library of the Society; and the Committee on the Historical Sciences was instructed to inquire whether there are any documents in the Society's collections which may elucidate the early history of Georgia, and to communicate with Dr. Stevens in regard to them.

The following donations were announced:—

FOR THE LIBRARY.

Flora Batava, of Afbeelding en Beschryving van Nederlandsche Gewassen, &c., 121 aflevering. 4to.—*From His Majesty, the King of the Netherlands.*

Mémoire sur la Bibliothèque Royale, &c. Paris, 1835. 4to.—*From Mr. John Penington.*

Second Mémoire sur la Bibliothèque Royale, &c. Paris, 1838. 4to.—*From the same.*

Institut Royal de France. Annuaire pour 1841.—*From Mr. D. B. Warden.*

Société Royale et Centrale d'Agriculture. Bulletin des Séances, Compte-rendu mensuel. No. 18, Juin et Juillet, 1840. No. 19, Août et Septembre, 1840. 8vo.—*From the same.*

Recherches sur l'Histoire et l'Origine des Foulahs ou Fellahs, par M. Gustave d'Eichthal. 1840. 8vo.—*From the Author.*

Première Note sur la nécessité de repousser, ou d'ajourner le projet de loi sur les Fortifications de Paris, &c., par Jullien de Paris, &c. &c. Paris, 1841. 12mo.—*From the Author.*

Fortifications de Paris, &c. &c. Seconde Note de M. Jullien de Paris, &c. Paris, 1841. 12mo.—*From the same.*

Report of the Commissioners under the Act of Congress of 20th July, 1840, for the purpose of Exploring and Determining the Boundary Line between the States of Maine and New Hampshire, and the British Provinces. Jan. 1841. Washington. 8vo.—*From the Commissioners.*

Report to the Secretary of State for the Home Department, from the Poor Law Commissioners, on the Training of Pauper Children; with Appendices. London, 1841. 8vo.—*From Mr. Frederick A. Packard.*

Proceedings of the Academy of Natural Sciences of Philadelphia. No. 1. March and April, 1841. 8vo.—*From the Academy.*

Journal of the Franklin Institute of the State of Pennsylvania. Third Series. Vol. I. May, 1841. No. 5. 8vo.—*From the Institute.*

A Discourse delivered before the Georgia Historical Society, on Friday, 12th Feb. 1841. By William Bacon Stevens, M.D. Savannah, 1841. 8vo.—*From the Society.*

A Biographical Memoir of Commodore Joshua Barney, &c. Edited by Mary Barney. Boston, 1832. 8vo.—*From Mr. Du Ponceau.*

Researches, Philosophical and Antiquarian, concerning the Aboriginal History of America. By J. H. M'Culloh, Jun., M.D. Baltimore, 1829. 8vo.—*From the same.*

The Committee, consisting of Mr. Walker, Dr. Patterson, Professor Alexander, Major Graham, and Captain Talcott, to which was referred, on the 16th April last, the letter of Mr. Simeon Borden, giving an account of his trigonometrical survey of Massachusetts, and a comparison of its results with

those effected by Mr. Paine's chronometrical survey of the same state, reported in favour of its publication among the Transactions of the Society, which was ordered accordingly.

Mr. Borden's paper gives an abstract of the principal results of the Trigonometrical Survey of Massachusetts, begun in the year 1831, and recently brought to a conclusion. It also gives a comparison of these results with those obtained by Robert Treat Paine, Esq., from observations with a Troughton's sextant and mercurial horizon, and chronometers transported to different stations.

The base line chosen for the Massachusetts survey, was on the Connecticut river, above Northampton; it was 7.388 miles long. The apparatus with which it was measured, was devised by Mr. Borden. It was fifty feet in length, and constructed on compensating principles. The measurement was marked by sections of 1000 feet, and was tested by a remeasurement in an opposite direction. The sum of the discrepancies, without regard to signs, between 25 spaces measured for 1000 feet each from N. to S., and the same spaces measured from S. to N., was 3.567 inches; making an average discrepancy of 0.14268 of an inch; and the first measurement of the entire base exceeded the second in length by 0.237 of an inch. The standard of length first selected, was a scale of two feet, constructed upon compensating principles, and of course unsuitable for subdivision. Being afterwards compared at Washington, by Mr. Hassler, Superintendent of the United States' Coast Survey, with his 82 inch scale of Troughton's construction, and which is an exact copy from the well known Troughton scale of Sir George Shuckburgh, it was found to be 0.0018 inches too short, at the temperature of 57°.5 Fah. But a part of the triangles having been, previous to this comparison, computed according to the Massachusetts scale, it was thought best to complete the calculations in the same manner, and make correction afterwards, when the proper standard should be fixed upon. For this standard, Mr. Borden chose Hassler's 82 inch Troughton at the temperature 62° Fahr. A trial base was not measured, and was not deemed indispensable, as the principal stations will ultimately be connected with those of the coast survey, and referred to Mr. Hassler's base.

The height of the stations above the sea-level was determined from comparison with a principal station on Fay's Mountain, situate in the town of Westboro', about thirty miles nearly west of Boston; the height of which was ascertained from levels carried forward, by means of vertical triangles, from five points of tide water, viz: at

Marblehead, Nahant, Marshfield, Hyannis, a village in the town of Barnstable on the south side of Cape Cod, and Bullock's Neck on the east side of Seekonk or Providence river. The extreme results differed less than one foot, though the stations embrace a distance of seventy or eighty miles of sea-coast. The point chosen for the mean height of the sea, was half way between high-water and low-water, as observed on the same day; care being taken to repeat the observation on days when the sea had been for some time (apparently at least) without agitation by high winds or storms.

After applying the reductions for the sea-level, and the standard length and temperature, the following results were obtained for the length of a degree of the meridian.

No.	Names of Stations.	Mr. Paine's Latitude.	Middle Latitude.	Deg. of Meridian in English ft.
	Station of Comparison, Harris Street Church, Newburyport, . .	° ′ ″ 42 48 32.1		
			° ′ ″	
1	Nantucket South Tower, . .	41 16 56.0	42 2 44.05	364313.17
2	Holmes' Hole Windmill, . .	41 27 15.3	42 7 53.70	389.25
3	New Bedford Mariners' Church, .	41 38 6.3	42 13 19.20	348.25
4	Barnstable Court House, . .	41 42 7.3	42 15 19.70	420.25
5	Sandwich Church, . . .	41 45 31.0	42 17 1.55	357.10
	Station of Comparison, Salem East India Marine Hall, . . .	42 31 18.9		
6	Nantucket South Tower, . .	41 16 56.0	41 54 7.45	364253.76
7	Holmes' Hole Wind Mill, . .	41 27 15.3	41 59 17.10	340.59
8	New Bedford Church, . .	41 38 6.3	42 4 42.60	279.42
9	Sandwich Church, . . .	41 45 31.0	42 8 24.95	274.76
10	Barnstable Court House, . .	41 42 7.3	42 6 43.10	447.68
	Station of Comparison, Highland Light, Cape Cod, ...	42 2 22.2		
11	Nantucket South Tower, . .	41 16 56.0	41 39 39.10	364385.00
	Station of Comparison, St. Ann's Church, Lowell, . . .	42 38 47.6		
12	New Bedford Mariners' Church, .	41 38 6.30	42 8 26.95	364236.76
	Station of Comparison, Gloucester Church, ...	42 36 44.20		
13	Barnstable Court House, . .	41 42 7.30	42 9 25.75	364925.68
14	Nantucket South Tower, . .	41 16 56.00	41 56 50.10	594.00
15	New Bedford Mariners' Church, .	41 38 6.30	42 7 25.25	738.33
	Station of Comparison, Harris Street Church, Newburyport, . .	42 48 32.10		
16	Plymouth Court House, . .	41 57 28.50	42 23 0.30	364604.50

Rejecting the four last results in consequence of their difference from the mean, the others give the value of a degree of the meridian in English feet at the several middle latitudes as follows:

FIRST RESULT.			SECOND RESULT.		
No.	Middle Latitude.	Length of Degree.	No.	Middle Latitude.	Length of Degree.
	° ′ ″	Feet.		° ′ ″	Feet.
1)	42 2 44.05	364313.17	3)	42 13 19.20	364348.25
2)	42 7 53.70	389.25	4)	42 15 19.70	420.25
6)	41 54 7.45	253.76	5)	42 17 1.55	357.10
7)	41 59 17.10	340.59			
8)	42 4 42.60	279.42		3) 45 40.45	3) 1125.60
12)	42 8 26.95	236.76			
9)	42 8 24.95	274.76		42 15 13.48	364375.20
10)	42 6 43.10	447.68			
			THIRD RESULT.		
	8) 336 32 19.90	8) 2535.39	11)	41 39 39.10	364385.00
	42 4 2.48	364317.00			

In the absence of the necessary data, to reduce the values thus obtained to the same middle latitude, Mr. Borden referred for the occasion to the table in Rees's Cyclopædia, under the article Degree, which purports to give the value of meridional degrees of the terrestrial spheroid for every degree of latitude, supposing an ellipticity of $\frac{1}{334}$th of the equatorial radius; and which indicates 57 feet as the increase in the value of the consecutive degrees, from the 40th to the 43d of latitude. Applying this increase, by arithmetical progression, to each of the foregoing values of the meridional degree, he inferred from them a value corresponding with the middle latitude 42°; and with the values thus reduced, and giving to each value a weight proportionate to the number of comparisons on which it was based, he obtained 364334 feet for the length of a degree whose middle latitude is 42°. The length of a degree perpendicular to the meridian, at the latitude of the Boston State House, he found from the convergency of the meridians to be 365511.33 feet, which value also he adopted. Its accuracy was tested by applying the results of trigonometrical measurement to the differences of longitude ascertained by Mr. Paine's chronometrical observations. The following values of degrees perpendicular to the meridian were attained in the same manner:

		Feet
1)	From Boston State House and Northampton Church,	365177.60
2)	„ „ and Plymouth Court House,	365653.00
3)	„ „ and Amherst College Chapel,	365025.00
4)	„ Springfield Court House and Plymouth Court House,	365888.43
5)	„ „ and Highland Light, Cape Cod,	365984.43
6)	„ Greenfield Church and Gloucester Church,	365420.76
7)	„ Boston State House and Pittsfield Church,	364193.11
8)	„ Plymouth Court House and „	364796.00
9)	„ Boston State House and Williamstown Church,	364519.42
	Sum of the first 6 results	6) 3149.22
	Mean of the first 6 results	365525.00

The three last of these results are rejected on account of their discrepancy from the mean. The astronomical observations for determining the longitude at Pittsfield and Williamstown are supposed by Mr. Borden to have been affected by mountain attraction; and he adopts the value of the degree perpendicular to the meridian as derived from the inclination of the meridians, in preference to the mean result given by this last table, in consequence of the discrepancies among its single results.

With the values of the meridional perpendicular degrees thus found, Mr. Borden calculated the equatorial radius, polar semi-axis, and ellipticity of the terrestrial spheroid, and the differences in value of the meridional degrees of 41° 21′ 30″, 42° 21′ 30″, and 43° 21′ 30″. His results are as follows:—

Meridional degree for the latitude of the State House, 364356 feet.

Perpendicular degree for the same latitude, 365511 feet.

Equatorial radius, 20914728 feet = 3961.123 miles.

Polar semi-axis, 20854128 feet = 3949.646 miles.

Ellipticity, $\frac{1}{343}$ nearly of the equatorial radius.*

Length of meridional degrees, the latitude of whose middle point corresponds to

°	′	″		Feet.	Difference.
41	21	30	=	364300.96	
					+ 55.04 feet.
42	21	30	=	364356.00	
					+ 55.22 „
43	21	30	=	364411.22	

* Combining the meridional degree measured in Peru in latitude 1° 30′ with the meridional degree measured in Massachusetts, they give an ellipticity of 1-313th nearly of the equatorial radius.

From the calculated differences in the value of these meridional degrees, it was apparent to Mr. Borden, that the increase of 57 feet to the degree, which he had adopted when preparing to deduce the value of the meridional degree from a combination of his proximate results, was not strictly accurate. But as the effect of the resulting error would scarcely have been appreciable, he did not deem it necessary to recalculate the work.

With the data already mentioned, Mr. Borden proceeded to determine the latitude of a *Cardinal* point, viz: the State House, Boston, by comparison with several of the principal stations, as follows:—

No.	Place compared with Boston State House.	Resulting latitude of Boston State House.
1)	New Bedford Mariners' Church,	42° 21′ 29″.81
2)	Harris Street Church in Newburyport,	29.70
3)	Salem East India Marine Hall,	30.37
4)	Saint Ann's Church in Lowell,	30.78
5)	Barnstable Court House,	31.04
6)	Sandwich Church in Sandwich,	29.94
7)	Highland Light House, Cape Cod,	28.78
8)	Nantucket South Tower,	28.95
9)	Holmes' Hole Windmill,	30.30
		9) 269.67
	Mean latitude of the State House	42° 21′ 30″.00
	Mr. Paine's Astronomical Result	42° 21′ 23″.03
	Discrepancy	6″.97

The results arrived at from these data by Mr. Borden, on the final reduction of the triangles of his survey, using for the latitude of the State House 42° 21′ 30″, and for its longitude, that which is given by Mr. Paine, $4^h\ 44^m\ 16^s.6$ west of Greenwich, are compared with the results of the chronometrical survey of Mr. Paine, in the following tables; which exhibit also the number of altitudes of the sun and north and south stars taken by Mr. Paine in determining the latitude of each station, and the number of journeys made by him with chronometers, and of the chronometers used by him on such journeys, in ascertaining its longitude.

LATITUDES.

No.	Place in which station is situated.	Name of Station.	Altitudes observed.	Paine's Latitudes.	Paine, north of Borden.
				° ′ ″	″
1	Boston	State House	442	42 21 22.70	—7 30
2	Amherst	College Chapel	109	42 22 12.60	—3 01
3	Barnstable	New Court House	267	41 42 7.30	+1 23
4	Cambridge	1st. Cong. Church	201	42 22 21.30	—7.81
5	Dedham	Do. do.	198	42 14 52.30	—5 00
6	Greenfield	Second do.	169	42 35 16 30	+1.50
7	Gloucester	1st. Independ't Ch.	113	42 36 44.20	—3.97
8	Holmes' Hole	Wind Mill West of Village	174	41 27 15.30	+0.43
9	Lowell	St. Ann's Church	300	42 38 47.60	+0.82
10	Monomoy Point	Light House	156	41 33 30.80	—4.20
11	Nantucket	South Tower'd Ch.	260	41 16 56.00	—0.62
12	New Bedford	Mariners' Church	322	41 38 6.30	—0.16
13	Newburyport	Harris st. Church	202	42 48 32.10	—0.05
14	Northampton	1st. Cong. Church	327	42 19 8.00	—1.44
15	Pittsfield	Do. do.	210	42 26 55.00	—0.61
16	Plymouth	Court House	169	41 57 28.50	+1.94
17	Providence, R.I.	University Hall	308	41 49 31.90	—3.58
18	Salem	E. Ind. Marine Hall	154	42 31 18.90	+0.48
19	Sandwich	1st. Cong. New Unita. Ch.	139	41 45 31.00	—0.09
20	Springfield	Court House	168	42 6 1.20	—2.41
21	Taunton	Trinitarian Ch.	181	41 54 8.30	—2 98
22	Truro	Cape Cod Lights	228	42 2 22.20	+1.16
23	Williamstown	Cong. Ch. near College	110	42 42 50.60	+1 46
24	Worcester	Antiquarian Hall	351	42 16 12.60	—4.44
25	Squam	Light	38	42 39 46.08	+2.56
26	Cape Ann	N. Light, Thatcher's Island	39	42 38 18.00	—3.78
27	Eastern Point	Light	36	42 34 48 00	—1.61
28	Baker's Island	Light	64	42 32 11.40	—0.60
29	Cambridge*	Harvard Observa. Transit	N. of Boston S. House,		52″ 26
30	Dorchester*	Bond's Transit. Ins.	S of do.		2′ 13″ 41
31	Southwick*	Holcomb's House	S. of Springfield C. H.		5′ 13″.91

* Nos. 29, 30, and 31, are according to Mr. Borden's survey, not having been principal stations of Mr. Paine. Their connection with the survey is important, from their being the site of a series of independent astronomical observations by Mr. Bond and Mr. Holcomb, which, when reduced, will further test the precision of the two methods employed by Messrs. Paine and Borden.

LONGITUDES.

No.	Place in which station is situated.	Journeys with Chronometers.	No. of Chronometers used.	Paine's Longitudes.	Paine, west of Borden.
				° ′ ″	″
1	Boston	9	25	71 4 9.00	+ 0.00
2	Amherst	18	59	72 31 35.85	+ 7.36
3	Barnstable	6	20	70 18 36.00	+ 2.19
4	Cambridge	7	23	71 7 38.10	+ 9.25
5	Dedham	6	14	71 10 49.20	−10.08
6	Greenfield	16	60	72 36 31.95	+ 4.75
7	Gloucester	10	36	70 40 19.05	+ 1.88
8	Holmes' Hole	14	34	70 36 37.80	+ 0.22
9	Lowell	2	10	71 18 57.30	− 4.74
10	Monomoy Point	10	28	70 0 5.40	+ 9.16
11	Nantucket	18	54	70 6 12.15	− 1.73
12	New Bedford	16	46	70 55 49.35	+ 4.96
13	Newburyport	24	74	70 52 47.10	+ 5.80
14	Northampton	13	39	72 38 21.00	+ 6.06
15	Pittsfield	10	33	73 16 5.10	+28.98
16	Plymouth	11	40	70 40 27.60	+ 8.33
17	Providence, R. I.	14	42	71 24 48.00	+13.59
18	Salem	13	38	70 53 56.70	+ 3.67
19	Sandwich	16	51	70 30 27.00	+13.81
20	Springfield	12	36	72 35 47.25	+ 2.31
21	Taunton	7	24	71 6 4.50	+ 9.47
22	Truro	10	28	70 4 8.70	+13.37
23	Williamstown	15	45	73 13 19.50	+19.24
24	Worcester			71 48 10.20	+ 2.84
25	Squam	2	14	70 41 8.00	− 4.31
26	Cape Ann	2	14	70 34 44.00	− 4.05
27	Eastern Point	By bearing from Gl	oucester Pt.	70 40 12.75	+ 1.90
28	Baker's Island	2	14	70 47 37.00	+ 8.59
29	Cambridge*	W. of State House, Boston		3 6.42	
30	Dorchester*	W. of do.		11.24	
31	Southwick*	W. of Springfield Court House,		12 59.86	

* See note on preceding page.

The mode of determining the topography of a state, of which Mr. Borden's paper gives the first account, is recommended by its economy and expedition, as well as by the very adequate accuracy of its results. The survey of Massachusetts, including 8230 square miles of territory, and having an indented sea coast of about 300 miles, has been completed by Messrs. Borden and Paine, in little more than ten years, and at an expense of 61,322 dollars.

Dr. Hays read a note to the report of the Committee, consisting of Dr. Horner and himself, on the Mastodon bones in the Society's possession; which was ordered to be published in the Transactions, with the report of the Committee.

Dr. Hays announced the death of Dr. William P. Dewees, a

member of the Society, on the 18th instant, aged 74; and on his motion, Dr. Hugh L. Hodge was appointed to prepare an obituary notice of the deceased.

Mr. Kane announced the decease of Don Jose da Silva Lisboa, of Rio Janeiro, a member of the Society.

Mr. Du Ponceau announced the decease of Count Miot de Melito, of France, a member of the Society, which occurred on the 15th of January last.

Mr. Lea called the attention of the Society to a beautiful living specimen of the Bulimus Ovatus, which he had received through Mr. Stern Humphreys, from Brazil, and made some remarks on its distinctive character and habits.

Mr. Walker read a letter from Professor Forshey, of Natchez, giving an account of several interesting displays of meteors.

Mr. Walker observed, that the display of the 20th of April, which was noticed in Virginia in 1803, and which has been referred to by MM. Arago, Quetelet, Herrick and others, was watched for by Mr. Herrick in the three last years, without any remarkable result. Corresponding observations were made in the present year at Cambridge, New Haven, Philadelphia and Washington, on the 19th; the 20th and 21st being cloudy, from 11 o'clock till midnight; but the number of meteors seen was not greater than usual. In the morning of the 19th, however, a gentleman of Philadelphia, Mr. William F. Kintzing, counted eight in the course of ten minutes, shortly after midnight.

At about 8 o'clock on the same night, the 18th, at Vidalia, in Louisiana, Prof. Forshey noticed an unusual number of meteors in different parts of the heavens, and on tracing their paths backwards, found that they traversed the Constellation Virgo. Having commenced precise observations at half past 8, and continued them for three hours, he saw in two hours and a quarter, forty-five minutes being lost in recording, sixty meteors, of which, all but five, passed within 10° from the common radiant point. These meteors were very unlike those of the August shower; being chiefly without trains, and of a reddish colour, few of them of the first magnitude, and the greater number of the third and inferior magnitudes. Their velocities were remarkably equal and gentle; their paths short; and their light first increasing, then waning, as if they were moving on a chord to the circle of visibility. Professor Forshey determined their radiant

point to be in a line drawn from Spica to θ Virginis, somewhat nearer to Spica, say in R. A. 198°, S. Decl. 8°. The convergent point was, therefore, in long. 19°.6, and lat. N. 0°.3, while the observer's motion was towards a point of the ecliptic in long. 299°. This gives a deflection of the path of the meteors, relatively to the true path of the observer, of 80°.6; and hence their true velocity cannot have been much less than that of the observer, or about sixteen geographical miles per second. This observation of the convergent point of these meteors, Mr. Walker regards as strongly confirmatory of the cosmical theory of shooting stars; inasmuch as it seems to demonstrate the existence in this group of a planetary velocity, like that of the December group observed by Mr. Herrick in 1838, in a direction normal to the observer's motion, and incapable of resulting from it.

Professor Forshey also observed the meteor shower of the 12th of November, 1833: he was then a cadet at West Point. While engaged, long before dawn, in preparing his morning recitation, his attention was caught by flashes of light at his window as if from lightning. The spectacle which met him on opening it, he describes as one of singular and fearful sublimity, the whole sky streaming with fire-balls, throwing a bright light upon the plain, and reflecting luridly against the mountains which enclose West Point. After a few minutes, finding no intermission in the display, he roused his associates to witness it; and the first sense of personal hazard yielding to the remark, that none of the meteors (meteorites, as he then supposed,) were actually descending into the plain, but that they became invisible before reaching the level of the mountains, he crossed the plain to awaken Professor Courtenay. While in company with this gentleman, he witnessed the magnificent meteor with a serpentine train, described by Professor Olmsted and others, and which has been called Twining's meteor, after the Professor who calculated its relative path and velocity. Both Professor Courtenay and himself noticed the white nebula which it left on exploding, and the beautiful silvery cloud that remained for some ten minutes after. He listened carefully, during the meteoric display, for the noises which are said sometimes to attend such phenomena, but could hear none; the explosion of the Twining meteor, he is confident, was not accompanied by an audible report.

Professor Forshey does not believe that the meteors of the 12th of November have the anniversary character. He has watched for them every year, except 1834 and 1836, since their appearance in

1833. He saw the great auroral arch of 17th Nov. 1835, from a point near the junction of the Ohio and Mississippi, and on the 14th November, 1837, he witnessed at Jefferson College a brilliant crimson arch, a rare phenomenon in that latitude, 31° 36′. He noticed, also, occasional brilliant meteors on the 13th and 14th of November, 1837, but they did not appear to come from the well known radiant point of 1833, in Leo. The times for observation in 1838 and 1839 were too cloudy to allow of satisfactory results. The subsequent anniversaries were clear, and well watched, but without any observation of interest.

Professor Forshey mentions that he had seen the zodiacal light in the west, from December to May, but that he first witnessed it in the east, on the 4th of October of last year, when it continued in great brilliancy from 3 A. M. till daylight.

Professor Bache communicated to the Society a statement of the Observations made for the year past at the Magnetic Observatory at the Girard College, and exhibited the original records, the abstracts made from them, the calculated results, and the curves by which they are represented. He reminded the members that in consequence of the depressed state of the Society's funds in May last, it had been judged inexpedient to ask for the appropriation of any part of them to the object of these observations; and he mentioned the names of ten members of the Society, and of three gentlemen, not members, Messrs. Richard Price and J. D. Brown, of Philadelphia, and Professor M'Lean, of Princeton, by whose liberality the Observatory had been supported during the year.

After some remarks from Mr. Walker, describing the results which have been arrived at by the labours of Gauss, Weber and others, in magnetism, and referring to the practical value to navigation of the magnetic investigations now making, Dr. Chapman pressed upon the Society the importance of continuing the magnetic and meteorological observations in the combined series which is now in the course of execution:—and on his motion, a committee was appointed to devise means for continuing the observations at the Girard College Observatory during the remaining two years of the series.

The Committee, consisting of Mr. Du Ponceau, Dr. Patterson, and Mr. Vaughan, to which was referred, on the 16th of

April, the letter from the President of the Royal Society of Sciences, Agriculture and Arts, of Lille, reported in favour of entering into correspondence with that Institution and interchanging with it the Transactions and other publications of this Society; and the Secretaries and Librarian were instructed accordingly.

Mr. Lea laid on the table several volumes of the Transactions of the Natural History Society of Northumberland, Durham, and Newcastle upon Tyne, England, for which he invited the Society to exchange a copy of its publications. On motion, the Librarian was instructed to make the proposed exchange.

Stated Meeting, June 18.

Present, twenty-seven members.

Dr. PATTERSON, Vice-President, in the Chair.

Mr. Gilliss, a member of the National Institution at Washington, was introduced as a visiter.

Letters were received—

From the Secretary of the Cambridge Historical Society, England, dated 17th Nov. 1838, acknowledging the receipt of Vol. VI. N. S. of the Transactions of this Society, and of the Second Volume of the Transactions of the Historical and Literary Committee:—

From the Secretary of the American Academy of Arts and Sciences, dated Boston, 25th May, 1841, acknowledging the receipt of three Parts of the Transactions and one number of the Proceedings:—

From Mr. J. Francis Fisher, dated 17th June, 1841, presenting to the Society some rare Tracts, by Cotton Mather.

The following donations were announced:—

FOR THE LIBRARY.

Institut de France. Mémoires de l'Académie Royale des Sciences. Tomes XIII. XIV. XV. XVI. XVII. Paris, 1835—1840. 4to. *From the Institute.*

Mémoires presentés par divers Savants à l'Académie Royale de France, Institut de France. Tomes V. VI. Paris, 1835—1838. 4to.—*From the same.*

Institut de France. Mémoires de l'Académie des Inscriptions et Belles-lettres. Tomes XI. XII. XIII. Paris, 1835—1839. 4to. *From the same.*

Rapports du Secrétaire perpétuel de l'Académie Royale des Inscriptions, &c. sur les travaux des Commissions pendant le 2me Sem. 1840. 4to.—*From the same.*

Notices et Extraits des Manuscrits de la Bibliothéque du Roi, &c. publiés par l'Institut, &c. Tome XIII. Paris, 1838. 4to.—*From the same.*

Société de Géographie. Recueil de Voyages, &c. Tome VI. Géographie d'Edrisi. Tome II. Paris, 1840. 4to.—*From the Society.*

Mémoires de la Société Royale des Antiquaires du Nord, 1836—1839. Copenhagen. 8vo.—*From the Society.*

Annaler for Nordisk Olkindighed adgione af det Kongelige Nordiske Oldscrift selskab, 1838. Copenhagen. 8vo.—*From the same.*

Royal Society of Northern Antiquaries. Reports of the General Anniversary Meetings in 1838 and 1839. Copenhagen, 1839. 8vo.—*From the same.*

Transactions of the Society for the Encouragement of Arts, Manufactures and Commerce, during the Session of 1839-40. Vol. LIII. Part 1. 8vo.—*From the Society.*

Proceedings of the Geological Society of London. Vol. III. Part 2. Nos. 72 to 75. 1840-41 8vo.—*From the Society.*

List of Members, &c. March 1, 1841.—*From the same.*

Transactions of the Cambridge Philosophical Society. Vol. VI. Part 3. Cambridge, 1838. 4to.—*From the Society.*

Journal Asiatique, ou Recueil, &c. publié par la Société Asiatique. IIIe. Sér. Tome X. Nos. 55 to 60. Sept. 1840 to Feb. 1841. 8vo.—*From the Society.*

Mémoires de la Société Royale des Antiquaires de France. N.S. Tome V. 1840. 8vo.—*From the Society.*

Proceedings of the Royal Astronomical Society. Vol. V. Nos. 12, 13. Feb. and Mar. 1841. 8vo.—*From the Society.*

Annales des Mines. 3éme. Sér. Tome XVII. 3éme. Livrn. de 1840. Paris. May, June, 1840. 8vo.—*From the Engineers of Mines, Paris.*

Résumé des Travaux Statistiques de l'Administration des Mines en 1838. Paris, 1839. 8vo.—*From Mr. Moncure Robinson.*

Statistique des Ports maritimes de Commerce. Paris, 1839. Fol. *From the same.*

Ponts et Chaussées. Situation des travaux au 31st Dec. 1838. Paris, 1839. 4to.—*From the same.*

Tableau Général du Commerce de la France, &c. pendant les années 1837, 1838. Paris, 1838–9. 2 Vols. Fol.—*From the same.*

Tableau Général des mouvements du Cabotage pendant l'année 1837. Paris, 1838. Fol.—*From the same.*

The Four Books or Classics of the Chinese, in the original, with a Commentary. 6 Vols. Gutzlaff's Magazine in Chinese. 1st Ser. Vols. I. II. The Gospels, Acts and Epistles in Javanese. 4 Vols. The New Testament, in Arabic. The New Testament, in Hindoosthanee. The Holy Bible, in Bengalee. The Gospel of St. Luke, in Canarese, dialect of Bengal. The Life of the Saviour, in Birmese. The Acts of the Apostles, in Siamese. The Acts, in Hinduwee. Summary of the Scriptures, in Murathee, of the Bombay Presidency. The Child's Book on the Soul, in the same. An Account of various Animals, in the same. The New Testament, in Goozuratee. The New Testament, in Tamul. The New Testament, in the language of the Sandwich Islands. The Holy Bible, in Malay. The New Testament in the same. 27 Vols.—*From Mr. J. Henshaw Belcher.*

The Ceylon Government Gazette, for the years 1834, 1835. 2 Vols. Fol.—*From the same.*

The Papers of James Madison, published by authority of the Congress of the U. S. under the Superintendence of Henry D. Gilpin. Washington, 1840. 3 Vols. 8vo.—*From the Hon. Henry D. Gilpin.*

The Journals of Congress, 1774 to 1778. Philadelphia, 1777—1778. 12 Vols. 12mo—*From the same.*

General Index of the Laws of the U. S. from 1789 to 1827, compiled by Samuel Burch. Washington, 1828. 8vo.—*From the same.*

Account of the Receipts and Expenditures of the U. S. for the year 1826. Washington, 1827. Fol.—*From the same.*

The Public Works of the United States. Edited by William Strickland, Edward H. Gill and Henry R. Campbell. Parts 1 and 2. London, 1841. Fol.—*From Mr. William Strickland.*

Reports, Specifications, &c. of the Public Works of the United States.

Edited by William Strickland, &c. London, 1841. 8vo.—*From the same.*

Prospectus, Specimens, and Catalogues of the Publications of M. M. Vandermaelen and Meisser. Brussels, 1841. 8vo.—*From the Editors.*

London Provident Institution. Annual Report, February, 1841, and Account of Receipts and Expenditures from 16th July, 1816 to 20th Nov. 1840.—*From Mr. William Vaughan.*

The American Medical Library and Intelligencer. Vol. IV. No. 24. By Robley Dunglison, M.D. &c. &c.—*From the Editor.*

Journal of the Franklin Institute. Vol. I. N. S. No. 6. June, 1841.—*From the Institute.*

A Commentary and Review of Montesquieu's Spirit of Laws, &c. &c. By Destutt Tracy. Philadelphia, 1811. 8vo.—*From Mr. Du Ponceau.*

A Monograph of the Limniades of North America. No. 2, Jan. 1841. By S. Stehman Haldeman, &c. &c.—*From the Author.*

Eleven Tracts by the Rev. Dr. Cotton Mather. Boston, 1699 to 1725. 12mo.—*From Mr. J. Francis Fisher.*

Remarks on Currency and Banking, by Nathan Appleton. Boston, 1841. 8vo.—*From Mr. Dexter Stone.*

Some Observations on the Situation, &c. of the Indian Natives of this Continent. Philadelphia, 1784. 12mo.—*From Mr. John Jordan.*

Fifteenth and Seventeenth Annual Reports of the American Sunday School Union. Philadelphia, 1839, 1841.—*From Mr. F. A. Packard.*

Letter to the Governor of Pennsylvania in relation to the Public Schools of England. Harrisburg, 1841. 8vo.—*From the same.*

Twenty-fifth Annual Report of the Directors of the American Asylum, &c. for the Deaf and Dumb. Hartford, 1841. 8vo.—*From Mr. Lewis Weld.*

Address before the Directors of the Public Schools, by James J. Barclay, President, &c. Philadelphia, 1841. 8vo.—*From the Author.*

Thirteenth Annual Report of the House of Refuge of Philadelphia. 1841. 8vo.—*From the same.*

Sixth, and Ninth to Fifteenth Annual Reports of the Boston Prison Discipline Society. 1831 to 1840. 8vo.—*From Mr. Louis Dwight.*

List of Donations to the Albany Institute, (Albany Daily Advertiser, 3d June, 1841.)—*From the Institute.*

Specimen of Printing Types, &c. cast by Johnson & Smith. Philadelphia, 1841. 8vo.—*From the Publishers.*

Charts. 1. A Chart of Pensacola Harbour and Bar, Florida, by Lieut. Col. James Kearney, U. S. Top. Engineers, from a Survey in 1822. 4 Sheets. 2. A Chart of Core Sound, North Carolina, in 1837, by the same. 3. Four Charts, portions of the preceding Chart, on an enlarged scale. 4. A Chart of part of Sandusky Bay, &c. in 1826, by Lieut. Campbell Graham, U. S. A. copied on a reduced scale. 1838.—*From Major James D. Graham.*

FOR THE CABINET.

Dried Specimens of Western and Southern Plants.—*From Dr. Charles W. Short, of Louisville, Kentucky.*

An Engraved Portrait of Dr. Philip Tidyman, by T. B. Welch.—*From the Engraver.*

The Committee, consisting of Dr. Patterson, Professor Bache, and Professor Vethake, to whom was referred a paper, entitled "On the Expansion of $F.(x + h)$" by Pike Powers, Esq. of the University of Virginia, reported in favour of its publication in the Transactions; which was accordingly ordered.

The paper of Mr. Powers consists of a new investigation of Taylor's Theorem. The only postulates assumed are, first, "that there are no functions, which throughout their whole range of values, change incessantly from increase to decrease, as x varies, and that by quantities greater than the change in x;" and, secondly, "that there are no functions, which, while they undergo a constant increase or decrease through finite intervals of value, yet always receive an infinite change for a finite change in x." On these data the demonstration of Mr. Powers is founded; but it is not of a nature to admit of an abstract.

A communication was received, entitled "Description of a New Form of a Transportable Original Barometer, and the Method of constructing and using the same, by F. R. Hassler;" which was read and referred to a committee.

Mr. Lea presented a continuation of his paper on Fresh Water and Land Shells; which was read and referred to a committee.

Professor Bache mentioned that he had received, for the Society, from our fellow member, Mr. Rümker, Director of the Observatory at Hamburg, under date of the 18th of March, 1841, a list of observations, made by him at Hamburg, of the last comet of 1840. The observations are as follows:—

1840.	Mean Time at Hamburg.			Apparent AR of Comet.			Apparent Declination of Comet.		
Oct. 31	8	22	0.08	19	0	39.467	60	55	28.69
Nov. 1	6	52	26.82	19	5	43.216	60	54	31.48
2	10	28	10.86	19	12	4.756	60	52	7.84
3	7	15	19.82	19	17	2.979	60	50	33.74
4	13	20	2.14	19	24	28.450	60	46	31.34
5	6	57	8.31	19	28	56.872	60	43	16.11
9	8	21	27.13	19	56	59.328	60	21	30.63
11	6	55	59.20	20	8	40.337	60	0	48.52
12	6	27	11.41	20	15	41.102	59	50	3.76
13	8	5	4.80	20	23	26.385	59	36	5.27
14	9	29	42.97	20	31	14.402	59	21	18.39
15	6	41	14.84	20	37	50.215	59	7	7.50
18	6	34	54.83	21	0	40.717	58	9	58.25
19	6	48	36.13	21	8	29.169	57	47	16.72
20	6	25	23.65	21	16	6.285	57	23	14.93
24	6	44	42.53	21	47	13.882	55	26	0.50
25	6	25	2.60	21	54	47.306	54	52	15.69
	13	41	46.60	21	57	7.628	54	42	19.72
26	7	9	17.20	22	2	38 673	54	15	27.30
29	7	33	59.12	22	25	6.281	52	15	46.65
Dec. 2	9	11	4.79	22	46	56.829	49	58	3.17
3	7	7	2.82	22	53	12.672	49	13	42.05
	8	49	21.41	22	53	42.254	49	10	52.41
6	6	56	47.26	23	12	59.638	46	43	49.08
13	7	42	40 03	23	54	19.495	40	19	3.31
14	7	0	57.18	23	59	29.358	39	24	18.23
15	6	17	45.63	0	2	52.297	38	29	7 03
16	8	50	43.24	0	10	6.085	37	27	56.16
18	7	34	23.16	0	19	31.004	35	39	31.85
19	8	47	55.91	0	24	25 567	34	41	30.99
21	8	2	41.39	0	33	15.525	32	54	42 36
23	7	58	57.91	0	41	47.577	31	8	36.33
25	7	42	27.06	0	49	52 085	29	26	8.12
	10	34	11.99	0	50	21.596	29	20	56.22
26	8	8	10.01	0	53	51.430	28	34	51.10
27	9	31	19.89	0	57	55.670	27	43	41.96

Nov. 19, at 7 46 50, mean time, the comet passed over a small star, in AR 21 8 51.280, Dec. 57 46 27.32 N.

Dr. Mitchell presented to the Society a short abstract of a paper, read by Dr. S. Brown, of Edinburgh, before the Royal Society of that city, on the subject of the apparent isomerism of silicon and carbon, and of iron and rhodium.

The proof sheets of this paper were sent by Mr. Combe, of Edinburgh, to Dr. Hare, in consequence of whose absence from Philadel-

phia they passed into the hands of Dr. Mitchell. Dr. M. promised to repeat some of the experiments of Dr. Brown, and to lay the results before the Society at a future meeting.

Professor Park noticed a new publication, recently announced, from the Geographical Institute at Brussels, by Messrs. Vandermaelen and Meisser, under the title of "Epistémonomie, ou Tables Générales d'Indications des Connaissances Humaines."

He observed, that its professed object is to give analytical references to all works, whether books, pamphlets, or articles in periodicals, on each respective subject of human knowledge. He expressed his regret, that in the specimen list which was forwarded to this Society, comprising the works on rail roads, those published in our own country appeared to be so generally neglected. He also remarked, that though the plan of the authors required a classification of human knowledge, they had united in one of twelve divisions, the subjects of mental and moral philosophy, religion, law and government, history, biography, languages and antiquities, although these cover nearly one-half of universal literature. Prof. Park announced a more equable and natural classification as about to be published, in which all human knowledge is primarily divided into the following four provinces:—1. ***Psychonomy***, or the Laws of Mind, comprising the Study of Languages, Metaphysics, Jurisprudence, and Religion: 2. ***Ethnology***, or the Study of Nations and Society, comprising Geography, History, Biography, and Poetry: 3. ***Physiconomy***, or the Laws of the Material World, comprising Mathematics, Physics, Natural History, and Medicine: and 4. ***Technology***, or the Study of the Physical Arts, including those of Construction, with Agriculture, Manufactures and Commerce, War, and the Fine Arts, particularly Painting, Sculpture and Music, and other subordinate subjects.

Mr. Lea, from the Publication Committee, presented a report on the state of the Committee's accounts, upon the completion of the 7th volume, New Series, of the Society's Transactions.

The Committee mention, that the expense of publishing this volume is about $1640, and that the balance remaining in their hands applicable to the publication of Vol. VIII., a part of which is already in press, is $166.38, besides about $600 which will probably be collected from subscribers for the preceding volumes.

The Committee, consisting of Dr. Chapman, Dr. Patterson, and Mr. Richards, which was appointed at the last meeting to devise means for completing the magnetic and meteorological observations which have been in progress during the past year, presented their report; and the recommendations of the Committee being under consideration, the Society adjourned to Friday evening the 25th instant.

Adjourned Meeting, June 25.

Present, thirty-five members.

Judge HOPKINSON, Vice President, in the Chair.

The Society resumed the consideration of the report which was under discussion at the adjournment of the last meeting.

In this report the Committee review the history of the concerted observations first proposed by the Royal Society of London in 1839, and refer to the action of this Society in consequence of the circular from that learned body. They express the strongest confidence in the skill, assiduity, and success, with which the operations of the magnetic observatory at Girard College have been thus far conducted, and a belief that their prosecution is called for by the honour of the Society. They pledge themselves, that as the funds required for the past year's expenditure have been furnished by individual contributions of the members and their friends, so those for the third year shall be supplied in like manner, if the Society will defray the charges of the intervening period from its corporate funds.

After a full discussion of the subject, resolutions were adopted by the Society—1. Directing the Committee on the Observatory to ask permission from the City Councils of Philadelphia to constitute, from certain moneys heretofore paid by the city, a fund for the promotion of astronomical and magnetic researches, and the publication of the results thereof: 2. Authorizing the Committee to refund, if required, certain

contributions made by individuals to the Astronomical Fund; and 3. Directing the trustees of that fund to supply the means of completing the magnetic and meteorological observations on certain terms and conditions.

NOTICE.

Members qualified to vote at the elections of the Society, Societies in correspondence with it, and Subscribers for its Transactions, are entitled to receive copies of the "Proceedings" at the times of their publication. Others desiring to receive them, are respectfully informed that the subscription price has been fixed at one dollar per annum, to be always remitted to the Treasurer in advance.

Those copies which are intended for distribution in foreign countries, will be transmitted in such manner as may be indicated by the parties to whom they are addressed: those for Philadelphia and other parts of the United States, by the medium of the post office. The Reporter will, however, retain them, if so directed, and will attend at the Hall on Friday evenings to deliver them in person. He particularly solicits that every irregularity occurring in the distribution may be communicated to him promptly, as it may not otherwise be practicable for him to supply missing numbers. The earlier part of the first volume has been for some months out of print.

Hall of the American Philosophical Society,
Philadelphia, 26th June, 1841.

ERRATUM—In No. 17, at page 43, in the fifth line, for "produce," read "precede."